A Mathematical Model about Squaring the Circle to Study the Astrotheology of Pegasus Constellation

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May 22, 2024

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Abstract

On this manuscript its addressed some subjects related with Pegasus Constellation and a geometric construction given to understand Squaring the Circle problem using vector projection. It is outlined the role of the spiritual origin on the conception of constellations on celestial sphere.
Keywords: Astronomy; Greek; Pegasus; Constellation; Astrotheology

1 An Introduction about Astrotheology

On ref[3] its introduced a geometrical model to study an Squaring the Circle construction with vector projection.

By the other side on ref[1,2] its make mention to a possible connection between such mathematical procedure with the architecture of early mentioned sites and some astronomical phenomenons (equinox and time scheduling) linked with Kukulkan´s pyramid and Cromlech-type sites; mainly Stonehenge zone.

Nowadays the literature about such subjects is broader with regard to the role of the ritualistic use of basic arithmetic calculus; linked with the notion of time scheduling like is establish on Gregorian calendar. Besides a certain notion of translation of earth around sun is also mentioned, based on the known use given to similar architecture structures; built like astronomical observatories. This role is basically understood since codex decoded and a kind of obvious astronomical observations linked with sun position thorough year.

In ancient epoch the area that studies the notion of spirituality and astronomical observation were called astrotheology. Some contemporary examples of this way of thinking are linked with the origin of God; like conception through the days that compound Winter solstice, when the birth of Jesus Christ is remembered. While in old-world was linked to some myth know by ancient cultures like Greeks; when its settle the origin of its deities within the constellations that gives their name.

The geometry pose on classic Greece only allowed *Euclidean solutions*; i.e. procedures that could be build exclusively with an unmarked straightedge and a compass in a finite number of steps. This limitation cause that during centuries the mathematicians occupied their efforts to propose a solution for the three problems mention next:

*) Squaring the Circle

**) Angle´s Trisection

***) Cube Duplication

until XIX century Pierre Wanzel demonstrate that this problems has no solution using only straightedge and compass through algebraic methods.

2 Pegasus Constellation and its shape-type square

The traditional 48 constellations were listed by Ptolemy; Pegasus constellation (Figure 1) was mention not only by him but also by Chinese astronomy; lying in "The Black Tortoise of the North" (point epsilon and theta) and Hindu astronomy with the also named "Great Square of Pegasus" contained in the 26th and 27th lunar mansions.

Frequently the perceive pattern of visible stars in an area on the celestial sphere is used like a celestial coordinate system of reference; however none archaeological, astronomical or mathematical vestige was found that justify the outline form of each constellation mention on any sky chart.

Figure 1 shows a possible construction of Pegasus constellation linked to the straightedge and compass construction given to understand "Squaring the Circle" by vector projection.

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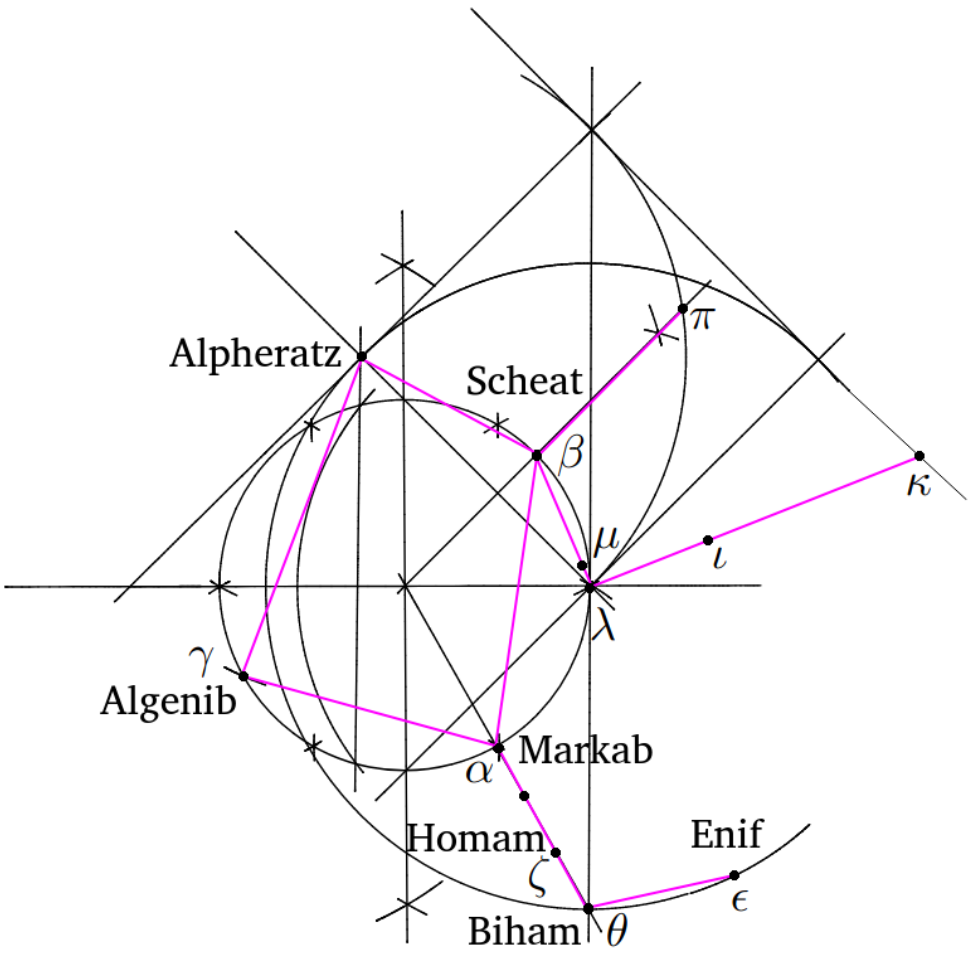

Figure 1. Pegasus Constellation Scheme over Squaring the Circle Construction of Ref[3]; made with GeoEnzo 2024 and Kolour Paint

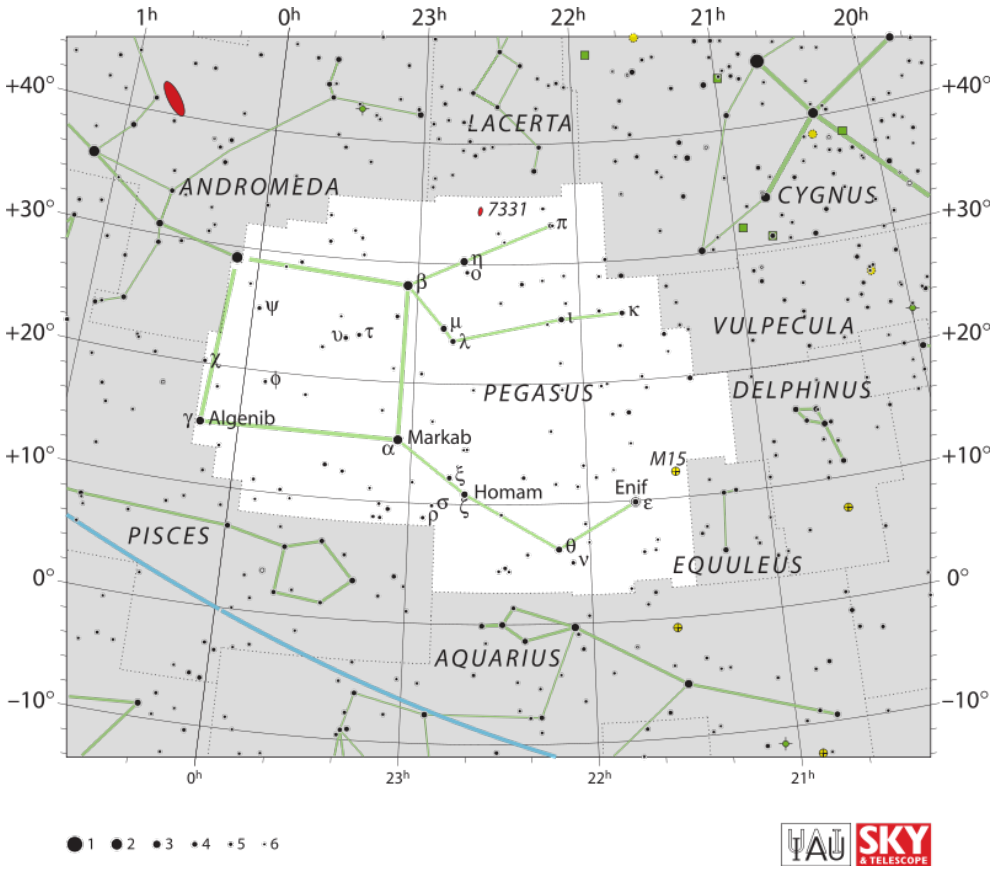

Figure 2. Pegasus Constellation Ref. IAU and Sky and Telescope magazine (Roger Sinnott and Rick Fienberg)

While the author of this manuscript consider that could exist more than one mathematical justification to draw any constellation; also believes that it is important to note next similitude of conceptions between the given mathematical procedure and the shape of Pegasus constellation:

1) Pegasus constellation define an abstract square while the mathematical procedure use this geometrical object explicitly (see ref[3])

2) Being an irregular square; Pegasus constellation could be related to the angles used to define the length of arc that gives place to the construction to an square of "same" area used on ref [1,2].

For the author of this manuscript is interesting to note that even when the problem of Squaring the Circle was (and remains) considered like unsolvable the outline of Pegasus constellation could be linked without to much effort to

almost all the mathematical approximations given on ref[1]. By the other hand is not so difficult to image the possible use of such mathematical method about Squaring the Circle into the astronomical science like possible tool to navigate, using like coordinate system of reference the celestial sphere.

Athena as the helper and protector of agriculture, is represented as the inventor of the plow and the harrow. According to the Corinthians and as Pausanias relates in his Description of Greece, Pegasus is taken to Bellerophon by Athena, who had tamed and subdued him herself. This notion of the myth around Athena and Pegasus is closely related to equinox, solstices and harvest; moreover the use of astronomy like mathematical tool to plan the life of Greek society and its works; as well as the indirect cult to mathematics practiced by Pythagoreans and Platonic school since 6th century to 4th century (ref[4]).

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3 References

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4 Online resources

[4] Wikipedia - Pegasus